

# Notice of Allowability

Application No.

10/609,490

Examiner

Dennis Myint

Applicant(s)

LEE, SHIH-JONG J.

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 02 August 2006.
2. ☒ The allowed claim(s) is/are 1,3,4,7,14,18,20 and 22.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

### **DETAILED ACTION**

1. In the amendment filed on 02 August 2006, Applicant has amended claims 1, 4, 7, 14, 18, and 22 were amended. Claim 15 is cancelled and its limitations are incorporated into claims 1, 7, and 14. Claims 2, 5-6, 8-13, 16-17, 19, 23-26, and 28-29 were also cancelled. Claims 27 and 30 were withdrawn.

Claims 1, 3, 4, 7, 14, 18, 20, and 22 are pending in this Office Action.

### ***Drawings***

2. Drawings filed on 25 June 2003 are accepted.

### ***Specification***

3. Specification filed on 25 June 2003 is considered and accepted.

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Shih-Jong J. Lee, Reg. No. 29738, on 15 August 2006.

Please replace claims 1, 4, 7, 14, 3, 20, 18, 22 with amended claims 1, 4, 7, 14, 3, 20, 18, and 22 and cancel claims 2, 5-6, 8-13, 15-17, 19, 23-26, 27, 28-29, and 30.

Claim 1 (currently amended): An integrated human and computer interactive data mining method comprises the steps of:

- a) Input a database;
- b) Perform learning, modeling and analysis using the database to create an initial knowledge model wherein the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules and multi-level abstraction visualization;
- c) Perform visualization processing of the initial knowledge model to create a knowledge presentation output containing
  - i. Ranks for the rules associated with each of tree terminal nodes,
  - ii. Contrast examples for each tree terminal node,
  - iii. Associated feature distribution profiles for each non-terminal node.
- d) Perform zoom and filter interactive data mining and dynamic learning and knowledge representation using the knowledge presentation output and the database to create or update the knowledge presentation output, wherein zoom and filter allow certain branches of the enhanced regulation tree to expand following human direction.

Claim 3 (previously presented): The integrated human and computer interactive data mining method of claim 1 wherein the knowledge presentation output further comprises rule ranking by information integration using global characteristics and population characteristics selected from the set consisting of:

- a) Local counts confidence for class  $c$  in a terminal node  $n$  is defined as:

$$LC_c^n = \frac{N_c^n}{\sum_{c \in All\_Classes\_in\_n} N_c^n};$$

- b) Local population confidence for class  $c$  in a terminal node  $n$  is defined as:

$$LP_c^n = \frac{P_c^n}{\sum_{c \in All\_Classes\_in\_n} P_c^n};$$

- c) Global counts confidence for class  $c$  in a terminal node  $n$  is defined as:

$$GC_c^n = \frac{G_c^n}{\sum_{c \in All\_Classes\_in\_n} G_c^n}; \text{ and}$$

- d) Global population confidence for class  $c$  in a terminal node  $n$  is defined as:

$$GP_c^n = \frac{g_c^n}{\sum_{c \in All\_Classes\_in\_n} g_c^n}.$$

Claim 4 (Currently Amended): The integrated human and computer interactive data mining method of claim 1 wherein the knowledge presentation output includes feature distribution profiles wherein a feature is normalized, weighted, and ranked and the ranks of the samples for the feature are prepared for quick feature visualization.

Claim 7 (currently amended): An integrated human and computer interactive data mining method comprises the steps of:

- a) Input a database;
- b) Perform knowledge creation selected from a group consisting of learning, modeling, and analysis using the database to create an initial knowledge model wherein the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules;
- c) Perform dynamic learning and knowledge representation using the initial knowledge model and the database to create or update a presentable knowledge model facilitating interaction with human by rule prioritization, clustering, and contrast example selection wherein contrast examples are selected from samples of similar characteristics that match selected rule yet have distinctively different labels;
- d) Perform zoom and filter interactive data mining and dynamic learning and knowledge representation using knowledge presentation output and the database to create or update the knowledge presentation output, wherein zoom and filter allow certain branches of the enhanced regulation tree to expand following human direction.

Claim 14 (currently amended): A multiple level integrated human and computer interactive data mining method comprises the steps of:

- a) Input a database;
- b) Perform knowledge creation selected from a group consisting of learning, modeling, and analysis using the database to create an initial knowledge model,

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wherein the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules;

c) Perform overview interactive data mining and dynamic learning and knowledge representation using the initial knowledge model and the database to create or update a presentable knowledge model, wherein overview uses a shallower enhanced regulation tree created by pruning a deep tree or simply limiting the depth of the enhanced regulation tree and combining all nodes beyond depth limit;

d) Perform zoom and filter interactive data mining and dynamic learning and knowledge representation using knowledge presentation output and the database to create or update the knowledge presentation output, wherein zoom and filter allow certain branches of the enhanced regulation tree to expand following human direction.

Claim 18 (currently amended): A presentable knowledge model generation method comprises the steps of:

- a) Input formatted data and a decision tree;
- b) Perform rule ranking using the formatted data and the decision tree to create ranked output;
- c) Perform feature profile generation using the formatted data and the decision tree to create feature profiles wherein a feature is normalized, weighted, and ranked by a weighting and ranking process and the ranks of samples for the feature are prepared for quick feature visualization.

d) Group the ranks and feature profiles to create a presentable knowledge model output;

e) Perform contrast example selection using the formatted data and the decision tree to create contrast examples and group the contrast examples, ranks, and feature profiles to create a presentable knowledge model output, wherein contrast examples are selected from samples of similar characteristics that match selected rule yet have distinctively different labels.

Claim 20 (previously presented): The presentable knowledge model generation method of claim 18 wherein rule ranking uses global characteristics and population characteristics selected from the set consisting of:

a) Local counts confidence for class c in a terminal node n is defined as:

$$LC_c^n = \frac{N_c^n}{\sum_{c \in All\_Classes\_in\_n} N_c^n};$$

b) Local population confidence for class c in a terminal node n is defined as:

$$LP_c^n = \frac{P_c^n}{\sum_{c \in All\_Classes\_in\_n} P_c^n};$$

c) Global counts confidence for class c in a terminal node n is defined as:

$$GC_c^n = \frac{G_c^n}{\sum_{c \in All\_Classes\_in\_n} G_c^n}; \text{ and}$$

d) Global population confidence for class c in a terminal node n is defined as:

$$GP_c^n = \frac{g_c^n}{\sum_{c \in All\_Classes\_in\_n} g_c^n}.$$

Claim 22 (Currently Amended): The presentable knowledge model generation method of claim 18 wherein the feature profile generation method normalizes automatically generated features and normalized features are weighted and ranked and the ranks of samples for each feature are prepared for quick feature visualization wherein the weighting and ranking process ranks a sample and uses its weight to generate a feature histogram.



### **Allowable Subject Matter**

5. Claims 1, 3, 4, 7, 14, 18, 20, and 22 are allowed.

The prior art of record, alone or in combination, does not teach or fairly suggest the combination steps as recited in independent claim 1, wherein “performing learning, modeling and analysis using the database to create an initial knowledge model wherein the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules and multi-level abstraction visualization; performing visualization processing of the initial knowledge model to create a knowledge presentation output containing

- i. Ranks for the rules associated with each of tree terminal nodes,
- ii. Contrast examples for each tree terminal node,
- iii. Associated feature distribution profiles for each non-terminal node;

performing zoom and tilter interactive data mining and dynamic learning and knowledge representation using the knowledge presentation output and the database to create or update the knowledge presentation output wherein zoom and filter allow certain branches of the enhanced regulation tree to expand following human direction”.

The prior art of record, alone or in combination, does not teach or fairly suggest the combination steps as recited in independent claim 7, wherein “performing knowledge creation selected from a group consisting of learning, modeling, and analysis using the database to create an initial knowledge model wherein the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each

node allowing incremental update of rules; performing dynamic learning and knowledge representation using the initial knowledge model and the database to create or update a presentable knowledge model facilitating interaction with human by rule prioritization, clustering, and contrast example selection wherein contrast examples are selected from samples of similar characteristics that match selected rule yet have distinctively different labels; and performing zoom and tilter interactive data mining and dynamic learning and knowledge representation using knowledge presentation output and the database to create or update the knowledge presentation output, wherein zoom and filter allow certain branches of the enhanced regulation tree to expand following human direction".

The prior art of record, alone or in combination, does not teach or fairly suggest the combination steps as recited in independent claim 14, wherein "performing knowledge creation selected from a group consisting of learning, modeling, and analysis using the database to create an initial knowledge model, wherein the initial knowledge model is an enhanced regulation tree deriving and storing additional statistics at each node allowing incremental update of rules; performing overview interactive data mining and dynamic learning and knowledge representation using the initial knowledge model and the database to create or update a presentable knowledge model, wherein overview uses a shallower enhanced regulation tree created by pruning a deep tree or simply limiting the depth of the enhanced regulation tree and combining all nodes beyond the depth limit; and performing zoom and tilter interactive data mining and dynamic learning and knowledge representation using knowledge presentation output

and the database to create or update the knowledge presentation output, wherein zoom and filter allow certain branches of the enhanced regulation tree to expand following human direction”.

The prior art of record, alone or in combination, does not teach or fairly suggest the combination steps as recited in independent claim 18, wherein “performing rule ranking using the formatted data and the decision tree to create ranked output; performing feature profile generation using the formatted data and the decision tree to create feature profiles wherein a feature is normalized, weighted, and ranked by a weighting and ranking process and the ranks of samples for the feature are prepared for quick feature visualization; grouping the ranks and feature profiles to create a presentable knowledge model output; and performing contrast example selection using the formatted data and the decision tree to create contrast examples and group the contrast examples, ranks, and feature profiles to create a presentable knowledge model output, wherein contrast examples are selected from samples of similar characteristics that match selected rule yet have distinctively different labels”.

The dependent claims, being definite, further limiting, and fully enabled by the section are also allowed.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Myint whose telephone number is (571) 272-5629. The examiner can normally be reached on 8:30AM-5:30PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Dennis Myint

AU-2162

*Cam yuung*  
primary Examiner  
Cam y tuong